You have constructed both series and parallel circuits, and noted some of the differences between them. We will now concentrate on series circuits to develop the concepts of current, voltage, and resistance. We will also eventually discover a relationship between the current, voltage, and resistance of a circuit.

The first concept we must master is *current*. The Exploration stated that circuit elements, when properly connected, have a current that moves through them. The current can be thought of as the *amount of charge flowing through the circuit each second*.

Current is measured in units called *amperes* (A) with a device called an *ammeter*. The ammeter is put into a circuit so that electricity flows through it. Hooking up the ammeter properly is very important. Improper hookup can destroy an ammeter.

Ammeter Hookup

Connect the positive (+) terminal of the ammeter to the part of the circuit leading to the positive (+) terminal of the battery.

Connect the negative (-) terminal of the ammeter to the part of the circuit leading to the negative (-) terminal of the battery.

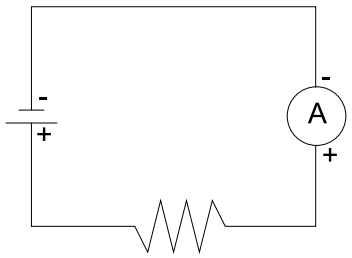
Never hook an ammeter into a circuit that does not have a resistor (such as a light bulb) in it.

Your ammeter has two or more red positive terminals. You must read the terminal's label to determine which scale on the meter is to be used. Some meters have a middle terminal for 0 to 500 *milliamperes*, or 0 to 0.5 amperes. **Always hook the circuit up with outermost (largest range) terminal first.** If the measured current is less than the maximum value for the next lower terminal, you should switch to it for greater precision.

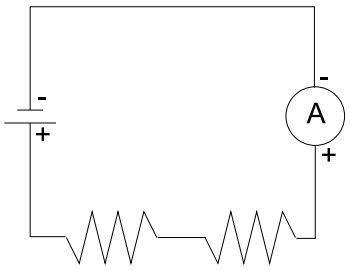
If the ammeter needle ever "pegs out" by shooting up beyond the scale limits, disconnect it immediately and ask Mr. M for assistance.

MEASURING CURRENT IN SERIES CIRCUITS

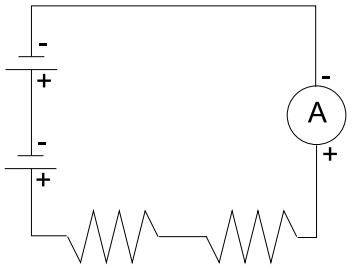
Ammeters are represented in circuit diagrams by a capital "A" with a circle around it. Connect batteries, light bulbs, and an ammeter as shown in the diagrams on the back. Record each ammeter reading under the appropriate diagram.



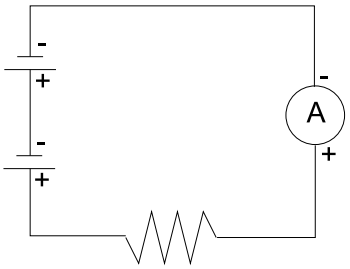
Circuit #1
Current = _____ A



Circuit #2
Current = _____ A



Circuit #3
Current = _____ A



Circuit #4
Current = _____ A

1. Which circuit had the brightest bulb(s)? _____ Which had the dimmest bulb(s)? _____

2. State the relationship between the measured current and the observed brightness of the bulbs.
ANSWER THIS AND ALL REMAINING QUESTIONS WITH COMPLETE SENTENCES

3. Which pair(s) of circuits would allow you to see how the number of sources affects current?

4. State how the number of energy sources affects the current in a circuit.

5. Which pair(s) of circuits would allow you to see how the number of users affects current?

6. State how the number of energy users affects the current in a circuit.